Supporting the work of operators of tele-assistance centers for visually impaired people

Software project

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I will be talking about:
- Navigational Centre for the Blind and its work
- The observed problems
- Techniques I want to use
- Possible solution of problems
Navigational Centre for the Blind

- Run by Czech Blind United (SONS)
- For all visually impaired people since 2007
- About 79,000 carried out requests from the opening
- Helps visually impaired persons to travel independently
The work of operator

- Providing information:
  - Travel services
  - Phone numbers
  - Etc.
- Creating itineraries and planning routes
- Remote Assistant
- Guide
Problem 1: Existing itineraries

- Itinerary for visually impaired people
  - is detailed description of route.
  - is provided in text form (.doc, .txt).

- Problems:
  - Files in multiple locations in computer
  - Updating itineraries
Problem 2: Creating itineraries and planning routes

- Itinerary includes:
  - Names of streets and public transport stops
  - Landmarks (railing, material of pavement…)
  - Pedestrian crossing information (number of traffic lanes, direction of cars, embossed tiles, semaphore…)
  - Distance of route sections
  - Etc.

- Planning routes is not so detailed

- Problems:
  - Searching if it already exists
  - Usage of existing itineraries
  - Confused multiple sources
  - Hard to detect slope of street
Remote Assistant
- is a mobile application.
- connects you with friends.
- is streaming video and your position on a map in real time.

Problems:
- Available only on App Store
- Showing only actual position of client
- Hard to detect direction of view
Techniques

- Template for generating itineraries
  - Naviterier Routeplanner
  - Route planning for blind pedestrians

- Techniques to improve the usability of route maps
  - Rendering Effective Route Maps: Improving Usability Through Generalization; Maneesh Agrawala and Chris Stolte, Stanford University (ACM 2001)
Techniques 2

- Techniques to display different routes to analyze diversity patterns
  - Visual Analysis of Route Diversity; He Liu, Yuan Gao et al, The Hong Kong University of Science and Technology (IEEE 2011)

- Technique to dynamically show labels around a movable lens
  - Extended Excentric Labeling; Enrico Bertini, Maurizio Rigamonti, Denis Lalanne, DIUF, University of Fribourg, Switzerland (IEEE 2009)
Remote assistant

Existing itineraries

Creating itineraries and planning routes
Solution 1: Existing itineraries

Marking possible outdated itineraries

Full-text search of itineraries
Solution 2: Creating itineraries and planning routes

- Searching start and destination location
- Drawing own route in a map
- Generating route in a map
- Route modifying
- Switching between maps/layers
- Generating skeleton of itinerary

The route from Krakovská 1695/21 to Resslova 1780/6: The route is approximately 1600 meters long and leads over 7 crossings. Stand so that you have a building at your back.

Segment 1 of 23. You are at the address Krakovská 1695/21. Turn to the right and go approximately 220 meters slightly uphill to the round corner with Žitná street. Keep the buildings on your right-hand side.

Segment 2 of 23. You are at the round corner of Krakovská and Žitná streets. Turn right and go approximately 70 meters slightly downhill to the round corner with Ve Smečkách street. Keep the buildings on your right-hand side.

Segment 3 of 23. You are at the round corner of Žitná and Ve Smečkách streets. Continue straight and cross Ve Smečkách street to the opposite corner via crossing with one-way traffic from left.

Segment 4 of 23. You are at the round corner of Žitná and Ve Smečkách streets. Continue straight and go approximately 100 meters slightly downhill to the corner with Štěpánská street. Keep the buildings on your right-hand side.

Segment 5 of 23. You are at the corner of Žitná and Štěpánská streets. Continue straight and cross Štěpánská street to the opposite corner via crossing with light signalization with one-way traffic from left.

Segment 6 of 23. You are at the corner of Žitná and Štěpánská streets. Turn to the left and cross Žitná street to the opposite corner via crossing with light signalization with one-way traffic from left.
Solution 2: Creating itineraries and planning routes

Setting streetview to show where to continue
Solution 3: Remote assistant

- Saving position from remote
- Finding destination of client
- Showing client's direction of view
Operator‘s feedback

- Itineraries
  - Good interface, but how to split itineraries into segments?
  - Generating itineraries will definitely help
    - Less writing

- Slopes
  - Not so important for him
  - In itineraries it will be mentioned and routes will be generated from them

- Remote assistant
  - Direction of view is not necessary in most cases
  - Very appreciated transferring client‘s position into map
Summary

- Introducing work and problems of operator for visually impaired people
- A few techniques I want to use
- Possible solutions of all problems
- Operator‘s opinion

- My next steps:
  - Creating more low-fidelity prototypes of my program
  - Testing these prototypes in navigational centre
Thanks for your attention.

Any questions?